Traumatic Laceration of Left Common Iliac Vein during Catheter Ablation — An Unusual Presentation of Cockett-May-Thurner Syndrome

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Introduction

May-Thurner syndrome (MTS) is a rare disorder characterized by compression of the left common iliac vein by the overlying right common iliac artery against the underlying vertebral body. It usually affects female patients aged between 20 and 50.[1,2]

Clinical presentations are often divided into acute MTS, characterized by acute pulmonary embolism or acute left lower limb deep venous thrombosis and chronic MTS, characterized by left lower limb chronic venous insufficiency with symptoms like asymmetric left-sided varicose veins, pain, and swelling.

We present the case of a female patient with a traumatic rupture of the common iliac vein during catheter placement for atrial fibrillation (AF) ablation with no previous diagnosis of MTS.

Case Report

A 56-year-old female, with drug refractory symptomatic AF was admitted in our institution to undergo radiofrequency ablation with electroanatomic mapping system (CARTO system – Biosense Webster) and intracardiac echocardiogram (ICE). She had no structural heart disease and no previous history of cerebral or pulmonary embolism, or deep vein thrombosis. She was previously anticoagulated with warfarin for 4 months and INR on the day of ablation was 2.5. Initially, right jugular vein was accessed for coronary sinus catheterization. Two-right femoral vein access was obtained by double transseptal puncture, and left femoral vein was accessed by ICE catheter. The ICE catheter was inserted under fluoroscopic views and some difficulty was noted for progressing the catheter immediately before the inferior vena cava (IVC) bifurcation but, afterwards, the ICE catheter was placed in the right atrium. Transseptal was performed under ICE and fluoroscopic guidance with no difficulties but, a few minutes later, blood pressure dropped to 50 mmHg. ICE was then placed in the right ventricle and the patient showed no pericardial effusion. Due to the difficulty in progressing catheter through iliac vein/IVC, ICE catheter was withdrawn and a phlebography was performed.

Keywords

May-Thurner Syndrome; Catheter Ablation; Ultrasonography, Doppler, Color; Phlebography; Stents.

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Interventional Procedure

Retrograde phlebography showed severe stenosis immediately after the origin of the left common iliac vein (LCIV) with a neck length of 5 mm. There was contrast extravasation through the anterior wall of the LCIV before the stenosis right next to the IVC bifurcation, and extensive collateral pathways through both internal iliac veins (Figure 1).

These findings rendered the diagnosis of MTS promptly considered. The next step of the procedure was the implantation of a coated stent to treat the traumatic vein rupture and stop bleeding.

A 13x5 Viabahn endoprosthesis (W.L. Gore, Flagstaff, AZ) was inserted through Terumo Radiofocus 0,035" stiff guidewire and implanted in the LCIV with proximal landing zone at its origin and distal landing zone above its bifurcation. A 18x120 mm Zilver Vena (Cook Medical Inc, Bloomington, IN) was implanted inside the previous Viabahn, extending from the distal IVC to the distal LCIV. Implantation of bare stent had two main reasons: 1) Fix the Viabahn inside the iliac vein to avoid device migration; 2) Provide correct treatment of MTS, addressing the entire vein segment underlying the compression zone, decreasing the risk of complications such as early thrombosis. After deployment of both devices, angioplasty was conducted with a 12x40 mm Mustang balloon (Boston Scientific, Marlborough, MA).

Control phlebography showed no contrast extravasation, no residual stenosis in the LCIV and no opacification of the previous collateral pathways (Figure 2).

The patient was admitted into the ICU for 48 hours with no complications and was discharged from the hospital on the third postoperative day. After three months of treatment, color Doppler ultrasonography was performed, showing patency of the iliac vein stent and collateral pathways were not noticed (Figure 3).

Discussion

Atrial fibrillation is the most common arrhythmia in the clinical practice. Catheter ablation of atrial fibrillation is a complex interventional electrophysiological procedure.[3]

Vascular complications are the most common features in AF ablation and are reported in up to 13%, including minor complications such as groin hematoma, femoral pseudo aneurysms and arteriovenous fistulae. Major complications such as retroperitoneal hematoma and vessel traumatic rupture are uncommon complications, but are associated with risk of death and prolonged hospitalization.[3] A worldwide survey of 8,745 AF ablation procedures found an incidence of femoral pseudo aneurysm and arteriovenous fistulae of 0.53% and 0.43%, respectively.[4]

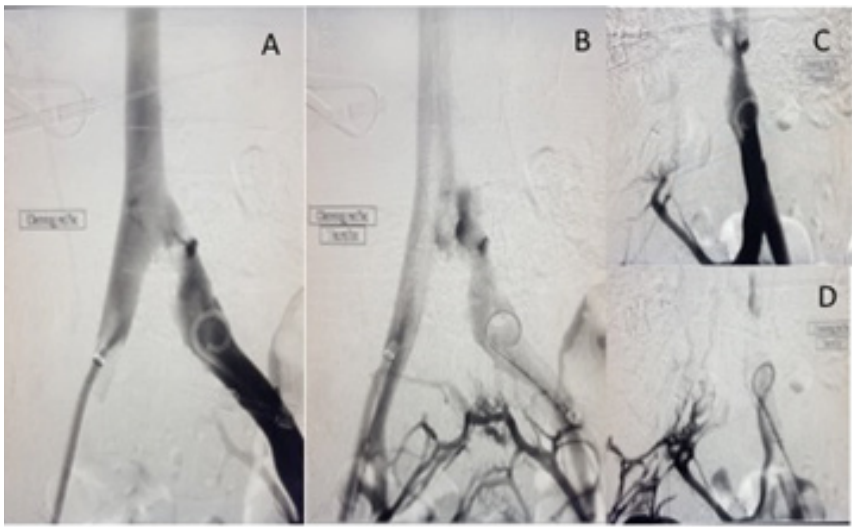

Figure 1 – *Retrograde phlebography. A: severe stenosis immediately after the origin of the LCIV; B: contrast extravasation through the anterior wall of the LCIV before the stenosis right next to the IVC bifurcation; C and D: extensive collateral pathways through both internal iliac veins.*

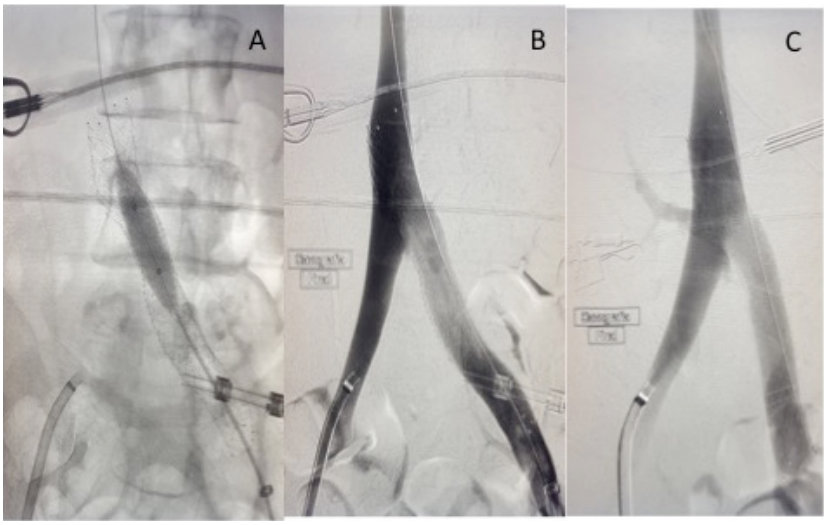

Figure 2 – *Control phlebography. A: Balloon post-dilation. B and C: No residual stenosis in the LCIV and absence of the previous collateral pathways.*

This relatively high incidence of minor vascular complications likely reflects the number and size of venous catheters associated with concomitant arterial line and intense anticoagulation prior, during and following the ablation procedures. In most electrophysiological laboratories, patients are fully anticoagulated during and following the ablation procedure. Furthermore, most procedures are performed with no interruption of the oral anticoagulant.[3]

May-Thurner Syndrome (MTS), also known as iliac vein compression syndrome, is a rare disorder.[5,6] The mechanism of thrombosis was described by these authors as a chronic pulsatile compression of the vein by the artery causing the development of collagen scars or spurs from endothelium repetitive trauma.[1] This endothelial damage affects venous outflow, leading to partial stenosis or occlusion. Later, Cockett and Thomas reported this condition, illustrating the relationship between iliac vein compression and post thrombotic syndrome. They carried out a clinical trial by surgically exploring patients diagnosed with iliofemoral venous thrombosis, and they found fibrous obstruction of the left iliac vein in all of their patients.[2] For this reason, it is also known as Cockett syndrome.[2] Most MTS patients, throughout the course of their lives, have no symptoms and, therefore, no

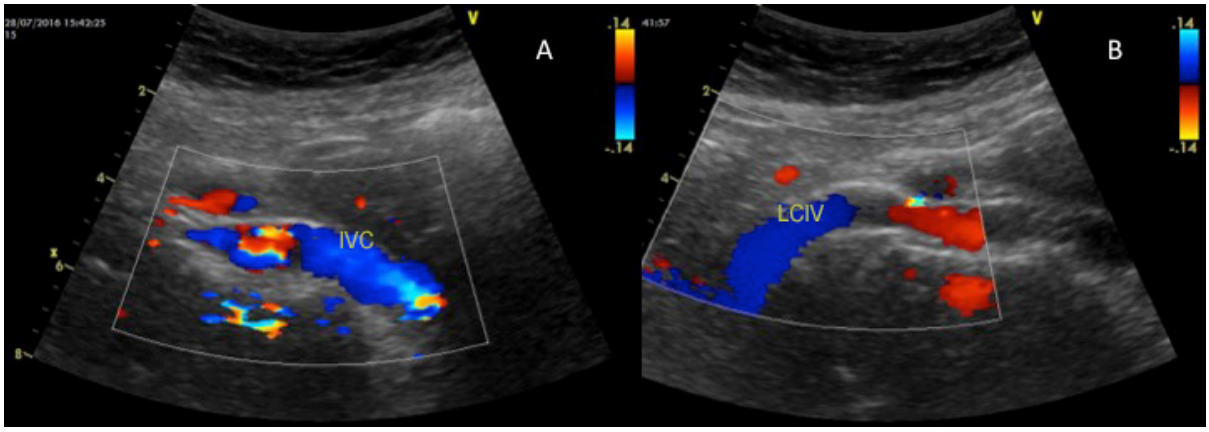

Figure 3 – *Color Doppler ultrasonography showing patency of left iliac vein stent.*

treatment is required. Many patients with MTS present DVT (77%), and others show only edema and pain without DVT (23%). It has been reported that the degree of venous compression resulting in acute symptoms should be greater than 70%.[7]

Endovascular treatment has been proven to be a feasible and effective method for treating MTS, a technique that mainly uses catheter-directed thrombolysis or balloon angioplasty and stenting.[8-11] Balloon angioplasty procedures lacking subsequent stent placement have been associated with low patency rates. A 73% recurrence rate was noted in patients with acute left-sided iliofemoral deep vein thrombosis when the underlying obstruction was not treated via stent placement.[12] MTS treatment almost always features the placement of auto-expandable stents because they are a more effective treatment of venous obstruction. Good patency rates have been reported in primary patency rates at 5 years, of around 80%.[13]

Our case report shows a rare complication of catheter position for atrial fibrillation ablation in a patient with underdiagnosed MTS. In this particular case, the LCIV right next to the IVC bifurcation was a technical challenge. The combination of coated stent and bare stent was safe, feasible and a good technical solution to provide adequate endovascular treatment for both the iliac vein compression and its complication. It is very important to have a high degree of suspicion if any uncommonly difficulty is present during progression of any devices through the left iliac veins and a pre-emptive phlebography should be accomplished.

Authors' contribution

Research creation and design: Barroso TA, Santos SN, Botelho F, Henz BD, Zanatta AR, Leite LR; Data acquisition: Barroso TA, Santos SN, Botelho F, Henz BD, Zanatta AR, Leite LR; Data analysis and interpretation: Barroso TA, Santos SN, Botelho F, Henz BD, Zanatta AR, Leite LR; Manuscript writing: Barroso TA, Santos SN; Critical review for relevant intellectual content: Barroso TA, Santos SN, Botelho F, Henz BD.

Potential Conflicts of Interests

I declare there are no relevant conflicts of interests.

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Academic Association

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